Title: Party On!

Brief Overview:

Students will plan a pizza party for twelve children. They will organize, interpret, analyze, display, and manipulate data that reflects a real-life situation. In addition, the students will construct and identify fractional representations. Finally, the students will use these skills to complete a performance-based assessment and order form.

Links to NCTM 2000 Standards:

- **Standard 1: Number and Operation**
  Mathematics instructional programs should foster the development of number and operation sense so that all students understand numbers, ways of representing numbers, relationships among numbers, and number systems; understand the meaning of operations and how they relate to each other; and use computational tools and strategies fluently and estimate appropriately. Students will develop meaning for fractions as part of a unit whole; recognize and use common fractions; and recognize and use common fraction equivalents.

- **Standard 5: Data Analysis, Statistics, and Probability**
  Mathematics instructional programs should include attention to data analysis, statistics, and probability so that all students pose questions and collect, organize, and represent data to answer those questions; interpret data using methods of exploratory data analysis; develop and evaluate inferences, predictions, and arguments that are based on data; and understand and apply basic notions of chance and probability. Students will organize data using tables and graphs, and they will use graphs to analyze data. They also will propose and justify conclusions based on data.

- **Standard 6: Problem Solving**
  Mathematics instructional programs should focus on solving problems as part of understanding mathematics so that all students build new mathematical knowledge through their work with problems; develop a disposition to formulate, represent, abstract, and generalize in situations within and outside mathematics; apply a wide variety of strategies to solve problems and adapt the strategies to new situations; and monitor and reflect on their mathematical thinking in solving problems. Students will demonstrate their ability to solve problems in mathematics including problems with real-world application involving fractions. They also will solve problems including problems with manipulatives, problems with open-ended answers, and problems that are solved in a cooperative environment.

- **Standard 7: Reasoning and Proof**
  Mathematics instructional programs should focus on learning to reason and construct proofs as part of understanding mathematics so that all students recognize reasoning and proof as essential and powerful parts of mathematics; make and investigate mathematical conjectures; develop and evaluate mathematical arguments and proofs; and select and use various types of reasoning and methods of proof as appropriate. Students will demonstrate their ability to reason mathematically by agreeing to the layout of the pizza, and they will gather mathematical evidence and defend their proof orally and in writing.

- **Standard 8: Communication**
  Mathematics instructional programs should use communication to foster an understanding of mathematics so that all students organize and consolidate their mathematical thinking to communicate with others; express mathematical ideas coherently and clearly to peers, teachers, and others; extend their mathematical knowledge by considering the thinking and strategies of others; and use the language of mathematics as a precise means of mathematical expression. Students will demonstrate their ability to communicate mathematically, and they will read, write, and discuss mathematics using the signs, symbols, and terms associated with data analysis and fractions.

- **Standard 9: Connections**
  Mathematics instructional programs should emphasize connections to foster an understanding of mathematics so that all students recognize and use connections among different mathematical ideas; understand how mathematical ideas build on one another to produce a coherent whole; and recognize, use, and learn about mathematics in contexts outside of mathematics. Students will use mathematical strategies to solve real-world problems. They also will use mathematical ideas built on one another to produce a coherent whole.

- **Standard 10: Representation**
  Mathematics instructional programs should emphasize mathematical representations to foster an understanding of mathematics so that all students create and use representations to organize, record, and communicate mathematical ideas; develop a repertoire of mathematical representations that can be used purposefully, flexibly, and appropriately; and use representations to model and interpret physical, social, and mathematical phenomena. Students will create and use representations to organize, record, and communicate mathematical ideas.

Grade/Level:

Grades 3-4

Duration/Length:

Four (sixty minute) periods

Prerequisite Knowledge:

Students should have working knowledge of the following skills:

- Performing basic operations
- Organizing data
- Completing a table
- Constructing a bar graph
- Recognizing fractions as part of a whole
- Recognizing equivalent fractions
- Expressing thoughts in writing

Student Outcomes:

Students will:

- work cooperatively in groups.
- organize, record, analyze, and display data.

- identify possible solutions for a real-world problem.
- identify fractional parts of a whole.
- identify equivalent fractions.
- add, subtract, and record money amounts.

Materials/Resources/Printed Materials:

- The Doorbell Rang by Pat Hutchins
- A supply of chocolate candy bars
- Crayons
- Scissors
- Student Resource Sheets
- Overhead of Teacher Resource #1
- Teacher Resource Sheets #1-5
- Student Resource Sheets #1-7

Development/Procedures:

Day 1

- Web students' ideas about things they have shared onto a class chart.
- Read The Doorbell Rang.
- Discuss the various ways that the cookies in the story were shared.
- Develop the concept of fair sharing and breaking a whole into equal pieces.
- Distribute one chocolate candy bar to a group of three or four children. Have students develop ways to share the candy equally. Let them verbally explain their choices.
- Record on the chalkboard the various fractional representations of the children's solutions.
- Have students choose something from the web and have them write a journal entry describing how it could be shared fairly. Encourage the use of fractions in their responses.

Days 2 and Day 3

- Have students recall fair sharing ideas from Day 1.
- Distribute Student Resource #1. Discuss.
- Distribute Student Resource #2. Have students complete Task 1 independently.
- Partner students to compare Task 1 results. Students should make corrections as needed. Answer key is provided in Teacher Resource #1.
- Distribute Student Resource #3, Task 2. Use Teacher Resource #2 to help students set criteria for the bar graph. Students will work with their partner to complete the bar graph. (Teacher will decide if modeling is necessary.)
- Share and compare bar graphs.
- Distribute Student Resource #4, Task 3 and display overhead of Student Resource, Task 1.
- Distribute Student Resource #7. The pizza shapes can be cut apart and used as manipulatives for Tasks 3 and 4 if necessary. (These should be saved for the next day.)
- Have partners complete Task 3. Collect when finished.

Day 4

- Review Tasks 1-3.
- Review equivalent fractions.
- Have partners complete Student Resource #5, Task 4. Remind children that explanations should demonstrate an understanding of equivalent fractions.
- Have students individually complete Student Resource #6, Task 5.

Performance Assessment:

- Students can be assessed at numerous points during this collection of interrelated tasks. Ongoing assessment is by teacher observation, completion of student resource sheets, and journal writing.
- A rubric is provided for Task 2 (Teacher Resource #2).
- The final performance assessment (Task 5) evaluates an individually completed order form. (See Teacher Resource #5.)

Extension/Follow Up:

- Read and discuss additional stories concerning sharing.
- Have students create and draw their own dream pizzas.
- Have students tally, price, and order pizza for the entire class.
- Show pizzas or other foods cut into various-sized pieces to compare different fractions.
- Compare pizza advertisements for the best value.
- Have the group of children make mini-pizzas with favorite toppings to share.

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Name _____ Date _____

Party On!

Your best friend is moving away, and you are planning a farewell party. Your parents are giving you $25.00 to spend for the party. You know you want to have pizza because that is your friend's favorite food. Your job is to plan the menu and complete an order form. Your order form will include how much of each type of pizza to buy. Remember, you must have enough pizza for all of your guests. You may not spend more than $25.00.

Name _____ Date _____

Task 1:

The invitations to the party have been sent. Each guest called and gave you choice of a pizza topping. Below is the list of your guests and their choices. Use this information to tally the data.

Guests

You- P	Taylor- S	Morgan-C
Kelly-V	Connor- S	Pat- P
Joe- C	Sam- P	Adrian- C
Alex- C	Kim- C	Danny- C

KEY

P= Pepperoni	**V= Veggie**
C= Cheese	**S= Sausage**

Types of Pizza Toppings

Pepperoni	Veggie	Cheese	Sausage

Task 2

Pizza Topping

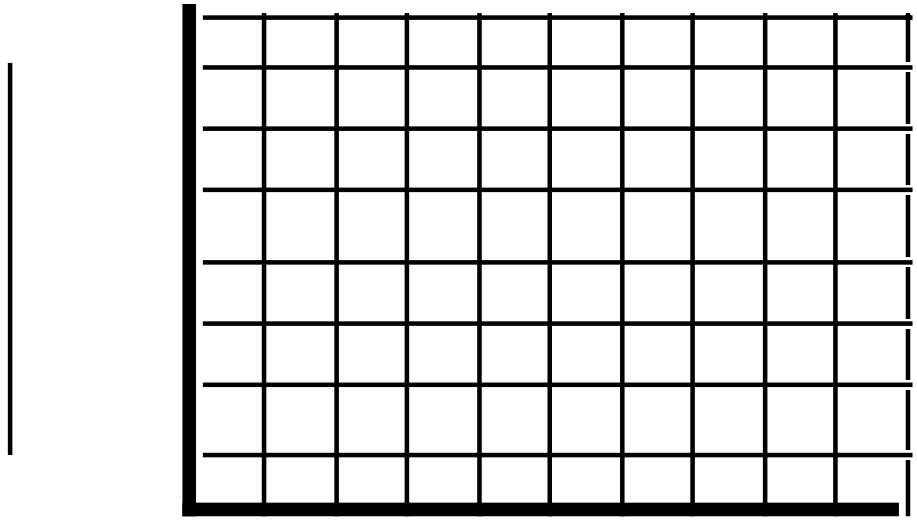
Bar Graph

Use the data from your tally sheet to construct a bar graph. Be sure to include: a title, appropriate labels, and a key if necessary.

Name _____

Date _____

TITLE



Three statements I can make about this data are:

_____

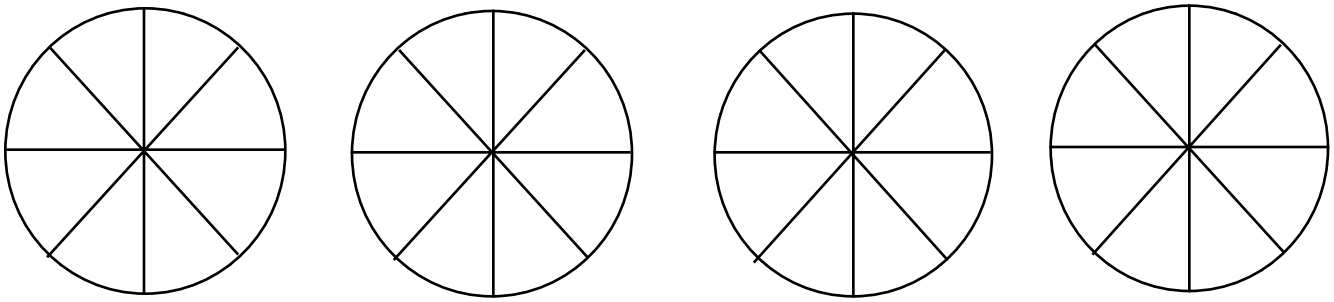
_____

_____

Name _____ Date _____

Task 3:

Each person can only have 2 slices of pizza. A whole pizza has 8 slices. Decide how many whole pizzas you will need to order. Use the pizza circles to help you find the answer.



1. How many whole pizzas do you need to order? _____

   Explain how you know. _____

   _____

   _____

   _____

2. Prove your solution by coloring in the pizza slices on the circles above. Use the key below to color the pizza slices. (Hint: You may refer to the tally chart.)

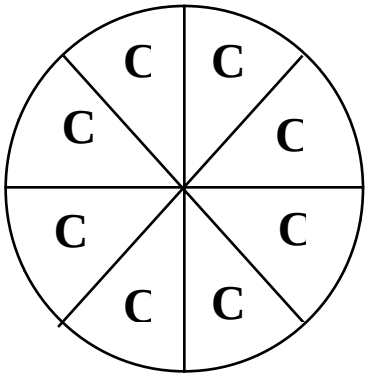
Key

Pepperoni- **Red**
Veggie- **Green**
Cheese- **Yellow**
Sausage- **Brown**

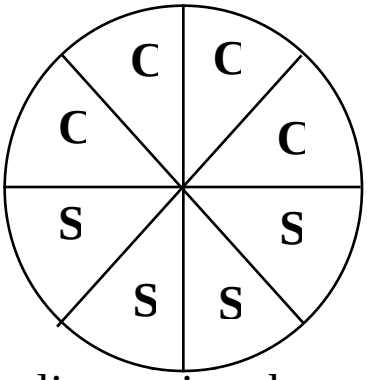
Name _____ Date _____

Task 4: **This is one example of how the pizzas were prepared.**

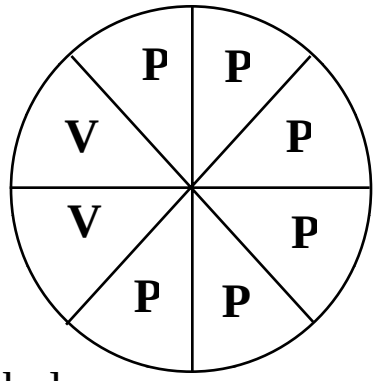
Pizza A



Pizza B



Pizza C



1. Color in the pizza slices using the colors below.

P=Pepperoni- **Red** V=Veggie- **Green** C=Cheese- **Yellow** S=Sausage- **Brown**

2. Look at the pizzas from above and complete the table.

Pizza	Fractional Part	Equivalent Fraction	Explain Your Thinking
A	**cheese**		
B	**sausage**		
C	**veggie**		

3. Suppose on Pizza C two of the pepperoni slices were changed to veggie.
   What fraction of the pizza would be veggie? _____

   Explain your answer.

   _____

   _____

   _____

Name _____ Date _____

Task 5:

Use the price list to fill out the Order Form. You will be ordering the pizzas that are shown in Task 4.

Price List	
Whole Cheese Pizza	**$6.25**
1/2 Cheese 1/2 Topping	**$7.50**
Topping on Whole Pizza	**$8.00**
6 Pack of Soda	**$3.00**
Chips	**$1.50**

1. Using fractions wherever needed, describe how to construct the pizzas that you are ordering. **Remember you only have $25.00 to spend.**

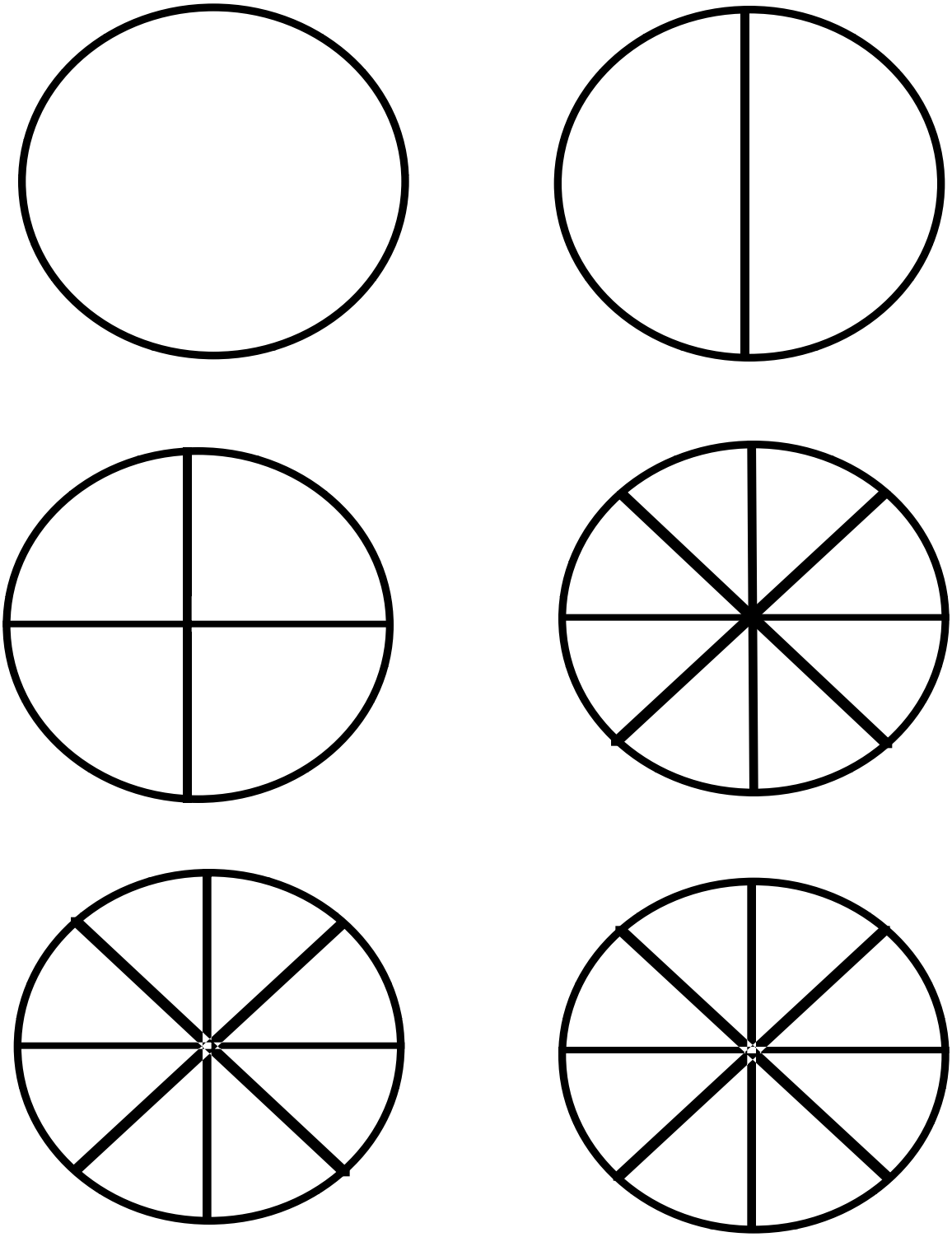
Kind of Pizza	Price
Hint: **1 pizza that is 1/2 pepperoni and 1/2 cheese**	**$ XX.XX**
Total	

2. Now look at the total amount you spent for the pizza. Will you have enough money left over to buy soda for all 12 of your guests? _____ Explain.

_____

_____

Pizza Templates



Name _____ Date _____

Task 1:

The invitations to the party have been sent. Each guest called and gave you choice of a pizza topping. Below is the list of your guests and their choices. Use this information to tally the data.

Guests

You- P	Taylor- S	Morgan-C
Kelly-V	Connor- S	Pat- P
Joe- C	Sam- P	Adrian- C
Alex- C	Kim- C	Danny- C

KEY

P= Pepperoni	**V= Veggie**
C= Cheese	**S= Sausage**

Types of Pizza Toppings

Pepperoni	Veggie	Cheese	Sausage
III	I	𝍸 I	II

Scoring Rubric for Task 2:
Pizza Topping
Bar Graph

Score 3:
- Three facts are clearly written in sentences.
- An accurate title is given.
- Two axes are labeled correctly.
- Numbers are clear and correct.
- The bars are accurately drawn .
- The bars are labeled correctly.
- The writing is clear.

Score 2:
- Two facts are clearly written in sentences.
- An accurate title is given.
- Two axes are labeled correctly.
- Numbers are clear and correct.
- The bars are accurately drawn.
- The bars are labeled correctly.
- The writing is clear.

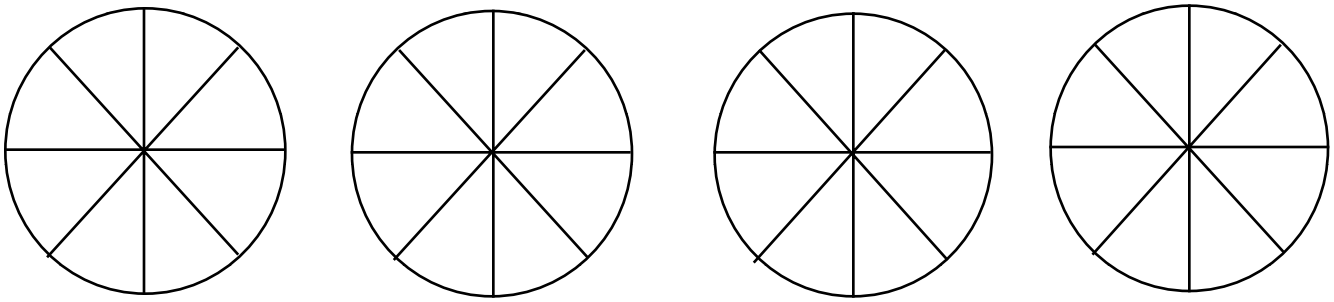
Score 1:
- One accurate fact is written.
- The title is given, but is incorrect.
- One axis label is correct.
- Numbers are clear, but not necessarily correct.
- The bars are drawn and labeled.
- The writing is clear.

Score 0:
- No facts are correct.
- Axes are incorrectly labeled or not labeled at all.
- Numbers are incorrect or unclear.
- Bars are not correct.
- Writing is not clear.

Name _____ Date _____

Task 3:

Each person can only have 2 slices of pizza. A whole pizza has 8 slices. Decide how many whole pizzas you will need to order. Use the pizza circles to help you find the answer.



1. How many whole pizzas do you need to order? __3__

   Explain how you know.

An acceptable answer might include:

• Each person needs 2 slices. There are 12 people. 12 x 2= 24

• I counted by 2's twelve times.

2. Prove your solution by coloring in the pizza slices on the circles above. Use the key below to color the pizza slices. (Hint: You may refer to the tally chart.)

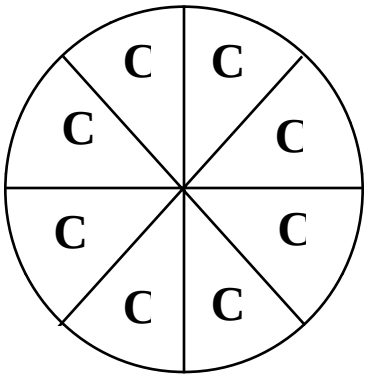
Key

Pepperoni- **Red**
Veggie- **Green**
Cheese- **Yellow**
Sausage- **Brown**

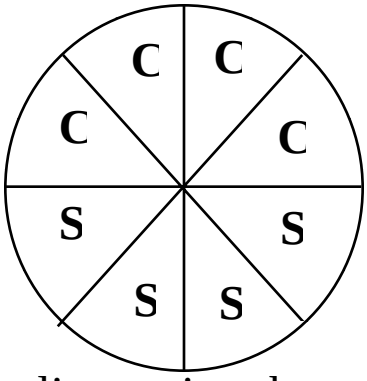
Name _____ Date _____

Task 4: **This is one example of how the pizzas were prepared.**

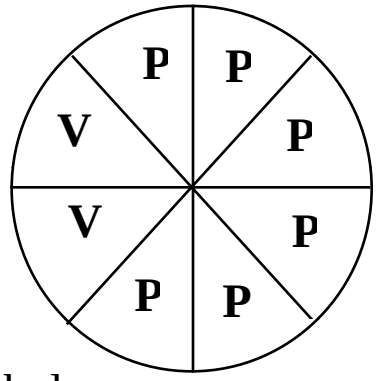
Pizza A



Pizza B



Pizza C



1. Color in the pizza slices using the colors below.

P=Pepperoni- **Red** V=Veggie- **Green** C=Cheese- **Yellow** S=Sausage- **Brown**

2. Look at the pizzas from above and complete the table.

Pizza	Fractional Part	Equivalent Fraction	Explain Your Thinking
A	**cheese** $\frac{8}{8}$	**1 whole**	**Answers should demonstrate understanding of equivalent fractions.**
B	**sausage** $\frac{4}{8}$	$\frac{1}{2}$	
C	**veggie** $\frac{2}{8}$	$\frac{1}{4}$	

3. Suppose on Pizza C two of the pepperoni slices were changed to veggie.
   What fraction of the pizza would be veggie? 1/2 or 4/8

Explain your answer.

Answer should demonstrate that the child has correctly represented the change in Pizza C.

Name _____ Date _____

Task 5:

Use the price list to fill out the Order Form. You will be ordering the pizzas that are shown in Task 4.

Price List	
Whole Cheese Pizza	**$6.25**
1/2 Cheese 1/2 Topping	**$7.50**
Topping on Whole Pizza	**$8.00**
6 pack of Soda	**$3.00**
Chips	**$1.50**

1. Using fractions wherever needed describe how to construct the pizzas that you are ordering. **Remember you only have $25.00 to spend.**

Kind of Pizza	Price
Hint: **1 pizza that is 1/2 pepperoni and 1/2 cheese**	**$ XX.XX**
1 whole cheese pizza	**$ 6.25**
1 pizza that is 1/2 sausage and 1/2 cheese	**$ 7.50**
1 pizza that is 3/4 pepperoni and 1/4 veggie	**$ 8.00**
Total	**$ 21.75**

2. Now look at the total amount you spent for the pizza. Will you have enough money left over to buy soda for all 12 of your guests? Explain.

Yes, only if sodas are shared equally. 1/2 can for each guest. Otherwise, the answer would be no, because each guest couldn't have a whole can without going over the $25.00 budget.